



EHS-International, Inc.

**U.S. GENERAL SERVICES ADMINISTRATION
FEDERAL CENTER SOUTH
GROUNDWATER MONITORING ASSESSMENT
NOVEMBER 2010 EVENT
FINAL REPORT**



Prepared for:

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December 27, 2010

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SUMMARY OF FINDINGS

The United States (US) General Services Administration (GSA) retained EHS-International, Inc. (EHSI) to conduct a Groundwater Monitoring Assessment within the northern portion of the Federal Center South property. The Federal Center South property is located at 4735 East Marginal Way South in Seattle, Washington 98134. The Groundwater Monitoring Assessment investigated locations include:

- The federal employee's parking lot in the northeast corner of the property;
- The northern area of Building 1202 that has been recently been demolished for erection of a new office building; and
- The parking area west of Building 1202 and east of the Duwamish Waterway.

The purpose of the Federal Center South Groundwater Monitoring Assessment was to further characterize, determine the extent, and identify potential source area(s) of vinyl chloride in the property groundwater. EHSI completed an historical records review to identify past land uses and activities that may have contributed to the release of vinyl chloride and related halogenated volatile organic compounds (VOCs) to the site groundwater. The data from the historical records review was used to select locations for installing groundwater monitoring wells to assess whether groundwater contamination had migrated from the identified potential source areas.

Based on results of the historical records review, EHSI identified seven potential on- and off-site sources for halogenated VOCs and its biodegradation by-products (e.g., vinyl chloride). The seven potential contamination source areas are:

- A former garage located within the north end of Building 1201, where solvents may have been used during vehicle assembly and missile manufacturing activities;
- Building 1202 was used as a distribution depot during the 1940s where laundry and dry-cleaning supplies, including perchloroethylene (PCE), a dry-cleaning solvent, were warehoused;
- Former property and vehicle maintenance shops that existed from the 1940s to the early 1970s in the northeast portion of Federal Center South property; where solvents may have been used associated with paint shops, vehicle repair/maintenance shops, and spray painting booths;
- A former Boeing anti-aircraft missile manufacturing plant loading dock, located north and adjacent to Building 1202, where storage of trichloroethylene (TCE) in drums may have occurred during in the 1950s through the early 1970s;
- A tall aboveground storage tank (AST) observed in 1965 and 1970 aerial photographs located west of and adjacent to the loading dock north of Building 1202;
- A historic paint manufacturing plant operated east and across E. Marginal Way South from the Federal Center South property from the early 1920s to the early 1940s; and
- A former heavy equipment business located southeast of Federal Center South, where halogenated VOCs were detected in groundwater.

EHSI identified an eighth potential source area, the Southwest Contaminated Soil Excavation, where buried drums and cans previously contained residual petroleum products were discovered and removed from the Southwest Excavation during site remediation at Federal Center South in August 2010.

EHSI supervised the installation and sampling of groundwater monitoring wells EHSI-MW5 through EHSI-MW10 at six selected locations. The well siting was based on the locations of the seven identified potential source areas and previous groundwater analytical results of samples collected from existing on-site wells.

EHSI observed no staining, odor, or other indication of contamination in soil samples retrieved during drilling of soil borings for the installation of six new groundwater monitoring wells.

During the November 2010 groundwater sampling event, EHSI personnel collected groundwater samples from the six new monitoring wells (EHSI-MW5 through EHSI-MW10), from existing wells FC-2, FC-3, FC-8, FC-9, and from Hart Crowser (HC) installed wells HCMW-1 through HCMW-3. The groundwater samples were analyzed for VOCs, specifically vinyl chloride. The analytical results of groundwater samples collected from these 13 wells, along with the analytical results of groundwater samples collected from the eight remaining wells at Federal Center South indicate the following:

- Vinyl chloride was detected in groundwater from 13 of the 21 existing Federal Center South monitoring wells. The detected vinyl chloride concentrations ranged from 0.24 µg/L to 13 µg/L and exceeded the Washington State Model Toxics Control Act (MTCA) Method A Groundwater Cleanup Level of 0.20 micrograms per liter (µg/L). Vinyl chloride in groundwater was detected in wells located along the northern portion of Federal Center South, within the vicinity of wells EHSI-MW2 and EHSI-MW8 between Buildings 1201 and 1202, and wells in the vicinity of the Southwest Excavation.
- TCE, cis 1,2-dichloroethene (cis DCE), and trans 1,2-dichloroethene (trans DCE) were also detected in groundwater samples collected from four on-site monitoring wells (EHSI-MW1, EHSI-MW7, EHSI-MW8, and HCMW-3) that also had high concentrations of vinyl chloride. TCE was detected in concentrations exceeding the MTCA Method A Groundwater Cleanup Level of 5.0 µg/L for TCE in groundwater samples collected from wells EHSI-MW7 and HCMW-3. The presence of these halogenated VOCs that typically biodegrade to vinyl chloride, indicates that potential source areas exist on the north side of the property (EHSI-MW1, EHSI-MW7, and HCMW-3) and the east-central portion of the property (EHSI-MW8).

Based on the results of the historical records review, the distribution and concentration of documented vinyl chloride in groundwater, and the presence of related halogenated VOCs, EHSI concluded that there three viable sources for vinyl chloride in groundwater within the Federal Center property. These source areas are:

- The Loading Dock Area north of and adjacent to Building 1202. Analytical results document that TCE and vinyl chloride, in concentrations exceeding regulatory cleanup levels exists in wells (HCMW-3, EHSI-MW1, and EHSI-MW7) installed within and adjacent to the loading dock. Historical research data confirms that it is

highly likely that TCE was used as a degreaser and cleaning solvent during Boeing missile manufacturing use of the Federal Center South property during the mid-1950s to the early 1970s. 1965 and 1970 historical aerial photographs document the presence of drums on and adjacent to the loading dock. In addition, Boeing reportedly stored hazardous substances in a former shed located adjacent to the loading dock.

- The Former Garage within the north end of Building 1201. The garage was present and used during Ford Motor Company vehicle assembly in the 1930s through the early 1940s, and during Boeing missile manufacturing in the mid-1950s through the early 1970s. Wells EHSI-MW2 and EHSI-MW8 were installed hydraulically downgradient of the former Building 1201 garage. The presence of vinyl chloride in groundwater detected from both wells, along with TCE and cis DCE in EHSI-MW8, and benzene in EHSI-MW2 indicate that release of solvents and petroleum products has occurred in this portion of the Federal Center South property.
- The Southwest Contaminated Soil Excavation. Well HCMW-1 is positioned immediately adjacent (west) of the Southwest Excavation, where buried drums and cans that contained residual petroleum products were discovered and removed during the August 2010 site interim remediation at Federal Center South (August 2010). Vinyl chloride was detected in groundwater samples collected from well HCMW-1, as well as from the sample collected from the newly installed well EHSI-MW5, located approximately 35 feet north of the Southwest Excavation. TCE was detected in the stockpile of contaminated soil removed from the Southwest Excavation, indicating that TCE was released in this area, possibly from buried drums and cans found in the excavation. We believe that the release of TCE has impacted groundwater and is the source of vinyl chloride. No vinyl chloride was detected in groundwater from the sample collected from well EHSI-MW6, located hydraulically downgradient of well HCMW-1 and east (approximately 25 feet) east of the Duwamish Waterway.

Based on the results and findings of the Federal Center South, all readily identifiable and documented chemical contamination liabilities exist due to the presence of vinyl chloride and TCE in concentrations exceeding regulatory cleanup levels. Vinyl chloride is present in concentrations in excess of regulatory cleanup levels throughout the north, mid-central, and mid-west portions of the Federal Center South property. In addition, TCE in concentrations exceeding regulatory cleanup levels, exist in groundwater within the northeast portion of the Federal Center South property.

There appears to be a selective general east to west migration path for vinyl chloride in groundwater along the north portion of the Federal Center South property. The Federal Center South property is an historic estuary that was filled in to provide a shoreline. We believe that the vinyl chloride migration path is indicative of a former stream channel into the Duwamish River.

EHSI recommends that an estimate of hydraulic conductivity be made for groundwater wells FC-2, FC-3, and FC-7 to determine if vinyl chloride detected in these wells will impact the stormwater retention design for the Federal Center South property. We also recommend that an estimate of hydraulic conductivity be made for groundwater monitoring well FC-9. The hydraulic conductivity will be used to ascertain the likelihood of vinyl chloride detected in this wells to migrate into the Duwamish Waterway, located west and hydraulically down-gradient of the well.

1.0 INTRODUCTION

GSA retained EHSI to conduct a Groundwater Monitoring Assessment within the northern portion of the Federal Center South property. The Federal Center South property is located at 4735 East Marginal Way South in Seattle, Washington 98134 (Figure 1). The Groundwater Monitoring Assessment investigated locations include:

- The federal employee's parking lot in the northeast corner of the property,
- The northern area of Building 1202 that has been recently been demolished for erection of a new office building; and
- The parking area west of Building 1202 and east of the Duwamish Waterway (Figure 2).

1.1 PROJECT PURPOSE

The purpose of this Groundwater Monitoring Assessment is to further characterize, determine the extent, and identify potential source area(s) of vinyl chloride in groundwater within the Federal Center South property.

1.2 PROJECT SCOPE OF WORK

The scope of work for this Groundwater Monitoring Assessment included a historical records review of the GSA Federal Center South property and adjoining properties, the installation of additional groundwater monitoring wells at six selected locations, and the collection/analyses of groundwater samples from the six new wells and seven existing wells.

1.3 SITE BACKGROUND

In May 2010, HC was retained by the site Contractor, Sellen Construction (Sellen) to drill pre-construction geotechnical borings prior to the construction of an office building on the property. During the May 2010 geotechnical work, HC encountered solvents in some of their geotechnical borings. At Sellen and GSA's behest, HC installed three groundwater monitoring wells within the Federal Center South property (HCMW-1 through HCMW-3) to assess groundwater quality (Figure 2). Groundwater analytical results from these wells indicated the presence of vinyl chloride at concentrations exceeding the MTCA Method A Groundwater Cleanup Level of 0.20 µg/L. The highest vinyl chloride concentration (13 µg/L) was detected in the groundwater sample collected from well HCMW-3, located within the loading dock area north-northeast of and adjacent to Building 1202. Other vinyl chloride associated halogenated VOCs (TCE, cis DCE, and trans DCE) were also detected in groundwater samples from this well.

In August and September 2010, EHSI geologist supervised the installation of groundwater monitoring wells at four selected locations around the perimeter of Building 1201 (EHSI-MW1 through EHSI-MW4; Figure 2). EHSI geologist collected groundwater samples from these four wells, along with existing wells FC-4 through FC-7 and HCMW-1 and HCMW-2. The results of the groundwater samples collected from these ten wells indicated that vinyl chloride was detected in groundwater from six of the ten sampled wells at concentrations exceeding the regulatory cleanup level and ranging from 0.24 µg/L to 2.7 µg/L. No vinyl chloride or other VOCs were detected in groundwater samples collected from wells EHSI-MW3, FC-4, FC-5, and FC-6.

On November 5, 2010, EHSI field personnel collected a groundwater sample for analysis from ponded water within a former underground electrical vault that was uncovered during the demolition of the north portion of Building 1202. The analytical result of this groundwater sample, designated as FCS-1202EX, indicated that the ponded water contained vinyl chloride at a concentration of 4.0 µg/L. This concentration also exceeds the MTCA Method A Groundwater Cleanup Level for vinyl chloride.

The groundwater analytical results of samples collected from the existing wells during May, September, and October 2010 events are summarized in enclosed Table 1.

1.4 INVOLVED PARTIES

GSA retained EHSI to execute this Groundwater Monitoring Assessment at the GSA Federal Center South under Contract No. GS-10P-08-LT-D-0088, Task Order #GS-P-10-10-LT-5077 between GSA and EHSI, dated May 27, 2010. EHSI retained Applied Professional Services, Inc. (APS) to locate underground utilities at each proposed soil boring and monitoring well location prior to executing drilling activities. Pacific Northwest Probe, Inc. of Edgewood, Washington provided soil boring and monitoring well installation services. EHSI geologists characterized soil samples retrieved during drilling of each well boring for soil descriptions and field screen testing. Friedman and Bruya, Inc. (F&BI) of Seattle, Washington analyzed samples collected during the field investigation.

1.5 FINAL REPORT ORGANIZATION

This report begins with a Summary of Findings, a summary of field services, a general property overview, a discussion of relevant previous investigations, general site conditions, and field observations follow the initial sections. Subsequent sections present the elements of the Groundwater Monitoring Assessment including a historical records review of Federal Center South and adjoining properties, as well as the field investigation (monitoring well installation, development, sampling, laboratory analyses, and analytical results), regulatory review, project conclusions, and recommendations. Three figures, two tables, and two supporting appendices follow the main text. Figure 1 is the Site Location Map of Federal Center South property. Figure 2 is the Site Layout Map and depicts the groundwater vinyl chloride analytical results. Figure 3 documents Potential Contamination Source Areas within and surrounding the Federal Center South property. Table 1 presents the analytical results of groundwater samples collected from 21 monitoring wells installed within the Federal Center South property. Table 2 presents the map coordinates for the groundwater monitoring wells and their static water level measurements. Copies of laboratory analytical reports for groundwater samples are provided in Appendix A. Soil boring logs and monitoring well construction logs are provided in Appendix B.

1.6 GROUNDWATER MONITORING ASSESSMENT OVERVIEW

The Federal Center South Groundwater Monitoring Assessment consisted of the following elements:

- Identification of potential groundwater VOCs source areas through a review of historical records review covering the Federal Center South property and adjoining properties;

- Installation of groundwater monitoring wells at six selected locations based on the findings during the historical records review and previous analytical results of groundwater samples collected from existing wells; and
- Collection and analysis of groundwater samples from the six new monitoring wells (EHSI-MW5 through EHSI-MW10) and from seven existing wells (FC-2, FC-3, FC-8, FC-9, HCMW-1, HCMW-2, and HCMW-3).

2.0 SITE OVERVIEW

The Federal Center South property is located southwest of the intersection of Diagonal Avenue South and East Marginal Way South, and east adjacent to the Duwamish Waterway, at 4735 East Marginal Way South in Seattle, Washington (Figure 1). The industrial/commercial property consists of an irregular-shaped parcel covering approximately 32.99 acres, and is identified by King County parcel number 357320-0975 (King County 2010); the Federal Center South property legal description is as follows:

INDUSTRIAL ADD ALL POR BLK 23 INDUSTRIAL ADD TGW POR TRS 1 & 2 - 14 THRU 17 - 35 & 53 KELLOGS TRS TGW POR VAC ST ADJ TGW LOTS C-D-E-F UNION PACIFIC ADD TGW BLK 382 SEATTLE TIDE LDS EXT #1 TGW POR VAC ST ADJ TGW POR VAC EXT DIAGONAL AVE S LESS CWW #1 DAF BEG 88.78 FT NWLY OF SE COR LOT 15 BLK 23 AS MEAS ALG E LN SD BLK 23 TH S 70-24-06 W 244.26 FT TO SW COR LT 15 TH N 39-15-20 W TO N LN SLIP #1 DAWSON ST WATERWAY TH N 79-35-39 W 611.50 FT TO ELY MGN CWW #1 TH NWLY ALG SD E MGN TO NXN C/L OF EXT DIAGONAL AVE S TH NELY ALG SD C/L TO NLY COR OF VAC DIAGONAL AVE S VAC ORD 99555 TH SLY ALG ELY LN OF VAC TO SLY MGN OF SD AVE THOF TH NELY & ELY ALG SD MGN TO E LN OF SD BLK 23 TH SLY ALG SD E LN TO POB

The Federal Center South property ranges 5 to 10 feet above mean sea level, consisting of a relatively level concrete/asphalt-paved parking lots and three large multi-story office and warehouse buildings. Buildings currently on-site include a large two-story, L-shaped, brick office and warehouse building (identified as Building 1201 – built in 1931) that faces East Marginal Way South and a large two-story warehouse building (identified as Building 1202 – built in 1940) that is located west-northwest of Building 1201 (King County 2010). Commercial businesses and federal agencies currently occupy office spaces in Building 1201. The northern half of Building 1202 is currently being demolished by Sellen in preparation for the construction of an office building. An alley with two former railroad track spurs exists between the buildings.

The majority of the Federal Center South Groundwater Monitoring Assessment work is located within the northern portion of the Federal Center South property.

3.0 HISTORICAL RECORDS REVIEW OVERVIEW

In October 2010, GSA tasked EHSI to conduct a historical records review of the Federal Center South property and adjoining properties located to the north, east, and southeast. The purpose of the historical records review was to identify past land uses and activities that may have contributed to the release of vinyl chloride and related halogenated VOCs to on-site groundwater. In addition, results from the review were used to select locations for monitoring wells to assess groundwater quality downgradient of the identified potential source areas of vinyl chloride.

Historical data on Federal Center South property and adjoining properties were obtained by reviewing readily available public agency and library sources including:

- Historical aerial photographs (1944, 1946, 1953, 1961, 1965, 1970, 1974, 1978, 1983/1984, and 1995; UW 2010a);
- Sanborn fire insurance maps of Seattle, Washington (1929, 1948, and 1967; UW 2010b);
- Historical records and maps covering the Federal Center South property at the National Archives and Records Administration (NARA), Pacific Alaska Region in Seattle, Washington (NARA 2010);
- Kroll's Atlas of Seattle and of King County, Washington (year dates 1920, 1946, 1950, 1958, 1960, 1966, 1971, and 1987; UW 2010d);
- Polk's Seattle City Directory (1919, 1920, 1922, 1924, 1931, 1934, 1938, 1942, 1948-49, 1958, and 1966; UW 2010c);
- King County iMAP property information website, including a 1936 aerial photograph of the Federal Center South property and surrounding area (King County 2010);
- Listed contaminated sites on environmental regulatory databases available online from the Washington State Department of Ecology (Ecology 2010) and US Environmental Protection Agency (EPA 2010); and
- Historical property assessment records of the Federal Center South property and surrounding properties to the north, east, and southeast at the Washington State Archives, Puget Sound Regional Branch (Puget Sound Archives 2010).

3.1 HISTORICAL RECORDS REVIEW RESULTS

Based on historical records review EHSI identified seven potential on- and off-site sources associated with the use of solvents related to halogenated VOCs. These seven potential source areas are described below and their locations are shown on Figure 3, with the letter designation corresponding to the source area.

- A. The Federal Center South property was first developed in 1931 with the construction of Building 1201, which was used by the Ford Motor Company (Ford) as a vehicle assembly plant. A garage was identified within the northern portion of Building 1201 (UW 2010b). This garage was also identified as part of the Boeing missile manufacturing plant that occupied Building 1201 and its environs in the mid-1950s through the early 1970s (NARA 2010; UW 2010b, d). Historic documentation established the use of solvents and petroleum products during vehicle assembly and maintenance (Ford) and missile manufacturing (Boeing) at this site.
- B. In the early 1940s, the War Assets Administration (WAA) acquired the former Ford Motor Company assembly plant and property. WAA constructed warehouse Building 1202 in 1940, used both Buildings 1201 and 1202 as a military storage and distribution center during the 1940s through the early 1950s (Seattle Armed Force Service General Depot; NARA 2010; King County 2010). Building 1202 was used by the WAA as a distribution depot during the 1940s. Laundry, dry-cleaning, and drums containing oil and other petroleum products were stored on-site (NARA 2010).

It is likely that PCE was stored on-site. However, no records were identified as to where dry-cleaning supplies were stored and handled within Building 1202.

- C. In addition to Buildings 1201 and 1202, several temporary (Quonset huts) and permanent buildings that housed property and vehicle maintenance shops were developed within the northeast portion of the Federal Center South property in the early 1940s. Quonset hut locations with possible historic use of solvents within this potential source area included paint shops with spray painting booths, motor repair facilities, and warehouses (NARA 2010; UW 2010a).
- D. In the early 1950s, WAA relinquished the Federal Center South property to the US Army Corps of Engineers (USACE; NARA 2010). USACE activities at Federal Center South property were not identified during records review. In the mid-1950s, both Buildings 1201 and 1202 were converted by the USACE for use by the Boeing Company as an anti-aircraft missile manufacturing plant (NARA 2010). Boeing manufactured BOMARC (Boeing Michigan Aeronautical Research Center) type missiles at Federal Center South between 1957 and 1970 (NARA 2010). TCE was found in groundwater at a similar New Jersey BOMARC missile manufacturing plant (PROACT 2006). Historical data at the New Jersey missile plant indicated that TCE was used as a degreaser during missile manufacturing and maintenance activities (PROACT 2006). We surmise that that TCE was also stored and used as a degreaser during Boeing missile manufacturing activities at Federal Center South. 1965 and 1970 aerial photographs document that numerous drums were stored on and adjacent to the loading dock area (UW 2010a). During the mid-1950s through the early 1970s Boeing also reportedly stored hazardous substances in a shed adjacent to the loading dock (Rich Olender 2010).
- E. 1965 and 1970 aerial photographs document the presence of a tall AST west of and adjacent to the loading dock area north of Building 1202 (UW 2010a). No records were identified during the historical records review as to the contents of this AST.
- F. From the early 1920s to the early 1940s, a historic paint manufacturing plant operated at 4700 E. Marginal Way South, east and across E. Marginal Way South from the Federal Center South property (King County 2010; UW 2010a, b, c, d; Puget Sound Archives 2010; NARA 2010). Solvent use associated with paint manufacturing was likely at this location.
- G. The Former Totem Equipment plant, located at 5000 E. Marginal Way South and southeast of the Federal Center South property, was listed on Washington State Department of Ecology (Ecology) contaminated sites database as having documented groundwater contaminated with halogenated VOCs. However, the reported concentrations were below their applicable MTCA Cleanup Levels (Ecology 2010).

EHSI also identified an eighth potential vinyl chloride source area, the Southwest Contaminated Soil Excavation. Buried drums and cans that contained residual petroleum products were discovered within the Southwest Contaminated Soil Excavation on the mid-west portion of the Federal Center South property (Figure 3). The drums, cans, and contaminated soil were removed from the Southwest Excavation during site remediation activities in August 2010 at Federal Center South (EHSI 2010). TCE was detected in contaminated soil removed from the excavation. The excavation materials appear to be a likely source of the TCE release to groundwater in the area.

3.2 ACTIVITIES AT FEDERAL CENTER SOUTH SINCE 1970

In the early 1970s, Boeing ceased missile manufacturing and GSA acquired the Federal Center South property. The former property and vehicle maintenance shop buildings located in the northeast portion of the property since 1941 (designated as source area C), were demolished and re-developed into a parking lot for federal employees. Since the 1970s, GSA leased spaces in Buildings 1201 and 1202 for use by the USACE as office spaces, and for other agencies and commercial businesses that may have used the warehouse spaces for vehicle maintenance, film development, arts and crafts, and medical laboratories (AMEC 2010). No records were identified regarding historic use and storage of hazardous substances (including solvents) in Buildings 1201 and 1202 from the 1970s to the present day.

4.0 GENERAL PROJECT DOCUMENTATION

EHSI field geologists documented daily field activities associated with the Federal Center South Interim Soil Remediation and Site Assessment in a bound serialized field note book. Information pertaining to personnel on-site, weather conditions, general activities planned and performed, and any problems encountered onsite were documented by the EHSI field geologist in the field note book.

5.0 GROUNDWATER MONITORING ASSESSMENT OVERVIEW

EHSI geologist supervised the installation of six monitoring wells at the Federal Center South property on November 10 and 11, 2010. EHSI retained APS to locate underground utilities at each proposed soil boring and monitoring well location prior to executing drilling activities. EHSI geologist characterized soil samples retrieved during drilling of each well boring for soil descriptions and field screen testing. Soil boring logs and monitoring well construction details are provided in Appendix B.

5.1 MONITORING WELL LOCATIONS

Well EHSI-MW-5 was installed to characterize groundwater quality in an area halfway between existing wells HCMW-1, FC-4, and FC-5 (Figure 2). Well EHSI-MW6 was installed due west approximately 50 feet from well HCMW-1 to assess groundwater adjacent to the Duwamish Waterway (Figure 2). Well EHSI-MW7 was installed along Diagonal Avenue South, west-northwest of the loading dock area north of Building 1202 to assess groundwater quality in this area and hydraulically downgradient from well HCMW-3 (Figure 2). Wells EHSI-MW8 and EHSI-MW-9 were installed immediately east of Building 1202 in close proximity to proposed storm water storage ponds associated with the construction of the new office building to assess the potential presence of vinyl chloride and possible impacts to the design of these storage ponds (Figure 2). Well EHSI-MW10 was installed approximately 50 feet due east from EHSI-MW1 to determine whether vinyl chloride-contaminated groundwater is migrating from potential hydraulically upgradient sources identified during historical records review (Figure 2).

5.2 WELL SOIL BORINGS

Six soil borings were advanced at selected locations as described in Section 5.1 to assess the extent and possible source areas of vinyl chloride contamination in groundwater. The well sitings were based on results from previous groundwater monitoring events and historical records review (groundwater monitoring wells EHSI-MW5 through EHSI-MW10; Figure 2). Soil samples retrieved during drilling of these borings were logged by an EHSI geologist for

soil lithologies and field-screened for indications of contamination. Soils were visually classified in accordance with the Unified Soil Classification System (USCS). Soil coloration was determined using Munsell® Soil Color Charts. Field screening included visual inspection for indications of chemical staining and measuring for the presence of volatile compounds using a photo voltaic ionization detector (PID). Pertinent soil descriptions and classifications, PID readings and other field screening results, and moisture content observations for each boring location were documented on individual soil boring logs (Appendix B).

5.3 MONITORING WELL INSTALLATION

Each of the six well borings was advanced to a maximum depth of 16 feet below ground surface (BGS). After drilling to the desired depth using a push probe drill rig, a groundwater monitoring well was installed at each of the six selected locations. Each well was constructed of 2-inch inside diameter Schedule 40 polyvinyl chloride (PVC) blank casing and flush-threaded to a 10-foot long, 0.010-inch slot machine cut PVC well screen casing. The well screen casing was pre-packed with clean 10/20 Colorado silica filter sand and capped at the bottom with a flush-threaded PVC bottom cap. Screened intervals at each well location were determined by the EHSI field geologist based on indications of moisture content observed in soil samples obtained at each sample depth interval during drilling. Additional silica filter sand was placed in the annular space between the casing and the borehole to a height approximately 0.5 foot or more above the top of the screened well casing. Bentonite chips were placed above the sand filter pack to within 1-foot of the ground surface. The wells were capped with locking well caps. Steel flush-graded well monuments were installed in-place over the wellheads and finished with concrete.

5.4 WELL DEVELOPMENT

Following well installation, EHSI geologist developed the six wells on November 12 and 13, 2010. All six groundwater monitoring wells were developed through a combination of purging and pumping using a battery-operated purge pump. Development of the wells continued until levels of fine-grained sand and silt were reduced and water removed from the well was generally of clear quality. Wells EHSI-MW5 and EHSI-MW6 dewatered during purging. Development of each of these wells was stopped for a period ranging from 10 to 30 minutes to allow water to recover prior to continuing development. Between 15 and 30 gallons of water was purged from each of the five of six newly installed wells. Because of very slow recovery of water during development of well EHSI-MW6, about 5 gallons of water was purged from this well. Development water from each well was contained in 55-gallon drums and stored near the well to await off-site disposal.

5.5 GROUNDWATER MONITORING AND SAMPLING PROCEDURE

EHSI collected groundwater samples from the six new wells, as well as existing wells FC-2, FC-3, FC-8, FC-9, HCMW-1, HCMW-2, and HCMW-3 during this event (13 wells sampled).

Prior to groundwater sampling, the static water level was recorded from each of the groundwater monitoring wells during this event. Static water levels were measured in each well relative to the top of its well casing (TOC) using an electronic water level meter. Each well was purged between three and five well casing volumes of stagnant water using clean, dedicated polyethylene tubing and a decontaminated battery-operated purge pump or a

dedicated disposable high-density polyethylene bailer prior to collecting samples. After purging the well, groundwater was allowed to recover in the well before collecting a groundwater sample using a dedicated disposable bailer. After sample retrieval, the water in the bailer was transferred directly into sample containers provided by the analytical laboratory. Care was taken to ensure that no bubbles or headspace were present when filling 40-ml VOA vials for VOC analysis. Immediately upon filling, each container was securely capped, labeled, and placed into a chilled cooler for storage prior to delivery to the analytical laboratory. The date and time of each sample collected was recorded in the field notebook and on the chain-of-custody form.

5.6 GROUNDWATER ANALYTICAL METHOD

Groundwater samples were collected from wells EHSI-MW5, EHSI-MW6, EHSI-MW7, EHSI-MW8, EHSI-MW9, EHSI-MW10, FC-2, FC-8, and FC-9 on November 15, 2010. Groundwater samples were collected from wells HCMW-1, HCMW-2, and HCMW-3 on November 16, 2010. Because of restricted access due to stone column installation in the vicinity, a groundwater sample was collected from well FC-3 on November 30, 2010.

All groundwater samples were submitted under chain-of-custody protocol to F&BI in Seattle, Washington for chemical analysis. All 13 samples were analyzed for the presence of VOCs, specifically vinyl chloride, using EPA Test Method 8260C. As requested by EHSI, F&BI laboratory provided the full VOC analytical results for samples collected from wells EHSI-MW7 and EHSI-MW8 following the vinyl chloride results to assess the presence of other VOC contaminants. These samples were selected because: 1) the highest vinyl chloride concentration was detected in well EHSI-MW7 during the November 2010 event, and 2) well EHSI-MW8 was advanced hydraulically downgradient of the former garage in Building 1201 and in close proximity of well EHSI-MW2, where petroleum-related contaminants, including benzene were also detected. Copies of F&BI laboratory analytical reports and chain-of-custody forms are provided in Appendix A.

5.7 GROUNDWATER REGULATORY REQUIREMENT

The purpose for the groundwater sampling at the GSA Federal Center South was to evaluate existing groundwater quality with the requirements of MTCA (173-340 WAC) Method A and B Cleanup Levels for Groundwater (173-340-720 WAC; Ecology 2007). State regulators and environmental professionals use MTCA Cleanup Levels to assess groundwater. MTCA Cleanup Levels are the concentrations standards where (if exceeded) the State of Washington regulators judge groundwater to be contaminated. The primary contaminant of concern identified at the GSA Federal Center South is vinyl chloride.

6.0 GROUNDWATER MONITORING ASSESSMENT RESULTS

6.1 GENERAL SITE SOIL CONDITION

General site soil stratigraphy at the GSA Federal Center South property, based on soil borings and monitoring wells installed during this field and previous investigations, as well as test pit explorations and contaminated soil removal activities consisted of fill material overlying alternate layers of silt with variable amounts of organic material. Fill, encountered from beneath the asphalt pavement to an approximate depth of 16 feet BGS, consisted of dark grayish brown sand and crushed gravel with variable amounts of silt. Underlying the coarse fill was a very dark grayish brown to black fine-grained sand fill encountered at depths in well borings EHSI-MW5 and EHSI-MW6 from 0.5 to 8.5 feet BGS; well boring

EHSI-MW7 from 0.5 to 11.5 feet BGS; and well borings EHSI-MW8 through EHSI-MW10 from 0.5 to the bottom of the borehole at 16.0 feet BGS. The base of the sand fill unit was not reached in borings EHSI-MW8 through EHSI-MW10 to a maximum depth of 16.0 feet BGS. Underlying the sand layer in well borings EHSI-5 through EHSI-MW7 was a very dark grayish brown to very dark gray silt with variable amounts of organic material and clay (native material). The base of the silt unit was not reached in borings EHSI-MW5 through EHSI-MW7 to a maximum depth of 16.0 feet BGS.

No staining, odor, or other indications of contamination were observed in soil samples retrieved from any of the six well borings advanced for this assessment. No PID readings from soil samples retrieved from each well boring.

6.2 GENERAL GROUNDWATER CONDITION

Groundwater was encountered during drilling of each of the six monitoring wells at depths ranging from 6.0 feet BGS at boring EHSI-MW5 to 8.0 feet BGS at EHSI-MW10. Static groundwater levels were measured at depths ranging from 4.2 feet BGS at well HCMW-1 to 7.3 feet BGS at well EHSI-MW8 (Table 2). Based on monitoring data collected during this and previous on-site groundwater monitoring events, the inferred groundwater flow direction beneath the GSA Federal Center South property generally ranged from west to southwest towards the Duwamish Waterway.

7.0 GROUNDWATER ANALYTICAL RESULTS

Groundwater analytical results of samples collected from the 21 monitoring wells across the GSA Federal Center South property are summarized in Table 1. Vinyl chloride results in groundwater at each well are shown on Figure 2.

7.1 NOVEMBER 2010 GROUNDWATER ANALYTICAL RESULTS

The November 2010 groundwater analytical results of the Groundwater Monitoring Assessment indicate the following:

- Vinyl chloride was detected in groundwater from nine of the sampled monitoring wells during the November 2010 event. Vinyl chloride was detected in wells EHSI-MW5, EHSI-MW7, EHSI-MW8, EHSI-MW9, FC-2, FC-9, HCMW-1, and HCMW-2 in concentrations ranging from 0.23 µg/L to 9.4 µg/L. Groundwater samples collected from wells EHSI-MW6, EHSI-MW10, FC-3, FC-8, and HCMW-3 contained no measurable concentrations of vinyl chloride above the test method reporting limit.
- The highest vinyl chloride concentration prior to the November 2010 event was detected in groundwater from a sample collected by HC from well HCMW-3 in May 2010. Vinyl chloride was not detected above the test method reporting limit for the groundwater sample collected from this well in November 2010. Well HCMW-3 is a shallow monitoring well (total well depth measured at 6.0 feet BGS) in comparison to the 20 other on-site wells (total well depths ranging from 10 to 15 feet BGS). The groundwater sample collected from HCMW-3 during the November 2010 event may not be representative of the groundwater quality at this location due to insufficient water volume and well construction deficiencies.
- In addition to vinyl chloride, TCE was detected in the groundwater samples collected from wells EHSI-MW7 and EHSI-MW8 at concentrations of 44 µg/L and 2.9 µg/L,

respectively. Cis DCE also was detected in both wells at concentrations of 55 µg/L and 6.9 µg/L, respectively. No other VOCs were detected above test method reporting limits in either sample.

Copies of the laboratory analytical reports associated with the groundwater samples are provided in Appendix A.

7.2 REGULATORY REVIEW

Vinyl chloride was detected in groundwater from 13 of the 21 existing Federal Center South monitoring wells (Figure 2). The detected vinyl chloride concentrations ranged from 0.24 µg/L to 13 µg/L and exceeded the MTCA Method A Cleanup Level of 0.20 µg/L for vinyl chloride in groundwater.

TCE was detected in groundwater collected from wells EHSI-MW7, EHSI-MW8, and HCMW-3 (May 2010 event). The TCE concentrations from EHSI-MW7 (44 µg/L) and HCMW-13 (6.2 µg) exceeded the MTCA Method Cleanup Level of 5.0 µg/L for TCE in groundwater.

Cis DCE was detected in groundwater collected from wells EHSI-MW1 (September 2010 event), EHSI-MW7, EHSI-MW8, and HCMW-3 (May 2010 event). Cis DCE concentrations in these four wells ranged from 5.4 to 55 µg/L, which are below the MTCA Method B Cleanup Level of 80 µg/L for cis DCE in groundwater. Trans DCE was detected in groundwater collected from EHSI-MW1 and HCMW-3 at concentrations ranged from 2.1 to 14 µg/L. Both detected trans DCE concentrations were below the MTCA Method B Cleanup Level of 160 µg/L for trans DCE in groundwater.

The benzene concentration detected in the groundwater sample collected from EHSI-MW2 (5.1 µg/L) during the September 2010 event exceeded the MTCA Method A Cleanup Level of 5 µg/L for benzene in groundwater. The groundwater sample from this well also had a diesel-range total petroleum hydrocarbons (TPH) concentration of 780 µg/L that exceeded the MTCA Method A Cleanup Level of 500 µg/L for diesel-range TPH in groundwater.

8.0 POTENTIAL VINYL CHLORIDE SOURCE AREAS

EHSI has identified three potential source areas for the vinyl chloride detected in nine site groundwater monitoring wells. The subsequent subsections describe the potential source sites.

8.1 LOADING DOCK AREA (NORTH OF BUILDING 1202)

The wells placed within and adjacent to the Loading Dock Area (North of Building 1202; HCMW-3, EHSI-MW7, and EHSI-MW1) have the highest documented concentrations of vinyl chloride detected in on-site groundwater (source areas designated as D, E, and possibly B; Figure 3). In addition, TCE was detected in groundwater samples collected from wells HCMW-3 and EHSI-MW7 at concentrations exceeding the MTCA Method A Groundwater Cleanup Level. Other related halogenated VOCs (cis DCE and trans DCE) also were detected in both samples. The presence of TCE and vinyl chloride in both samples indicate that a release of TCE is likely within the loading dock area. Groundwater collected from wells located hydraulically downgradient from the loading dock area also contained vinyl chloride at concentrations above the regulatory cleanup level (wells EHSI-MW4, HCMW-2, FC-7, FC-2, and FC-9). Potential off-site vinyl chloride migration into the Duwamish Waterway exists on the basis of the presence of vinyl chloride in well FC-9. Well FC-9 is

located within 65 feet east of the Duwamish waterway. However, vinyl chloride was not detected above the test method reporting limit in the groundwater sample collected from well EHSI-MW10, indicating that the release had not migrated from the hydraulically upgradient former property and vehicle maintenance shops area (designated as source area C; Figure 2).

8.2 BUILDING 1201 FORMER GARAGE

On the basis of groundwater analysis and historic use, EHSI identified the Former Garage Area as a potential vinyl chloride source. Groundwater samples collected from wells EHSI-MW2 and EHSI-MW8 contained vinyl chloride at concentrations above the regulatory cleanup level. The sample from well EHSI-MW8 contained related halogenated VOCs including TCE (2.9 µg/L) and cis DCE (6.9 µg/L). The groundwater sample from well EHSI-MW2 contained petroleum-related contaminants including benzene and diesel-range TPH, of which both concentrations exceeded MTCA Method A Groundwater Cleanup Levels for benzene and diesel, respectively. The presence of these chemical compounds indicates that a release of solvents and petroleum products associated with vehicle assembly and missile manufacturing has likely impacted groundwater beneath a former garage located inside Building 1201 (designated as source area A; Figure 3). Both wells EHSI-MW2 and EHSI-MW8 are located hydraulically downgradient of Building 1201 and the former garage.

8.3 SOUTHWEST CONTAMINATED SOIL EXCAVATION

The third potential source area identified by EHSI is the Southwest Contaminated Soil Excavation, where buried drums and cans that contained residual petroleum products were discovered and removed during the August 2010 site interim remediation at Federal Center South (EHSI 2010; Figure 2). Vinyl chloride was detected in groundwater from wells HCMW-1 and EHSI-MW5 at concentrations above the MTCA Method A Groundwater Cleanup Level. TCE was detected in the stockpile of contaminated soil removed from the Southwest Excavation (EHSI 2010), indicating that TCE was released in this area, possibly from residual TCE in the buried drums and cans found in the excavation. The release of TCE has impacted groundwater in this area of the site. No vinyl chloride was detected in groundwater from the sample collected from well EHSI-MW6, located hydraulically downgradient of well HCMW-1 and east (approximately 25 feet) east of the Duwamish Waterway (Figure 2).

8.4 OTHER IDENTIFIED POTENTIAL SOURCE AREAS

EHSI believes that it is unlikely for vinyl chloride in groundwater detected onsite had migrated from the two remaining off-site sources, the former paint manufacturing plant (designated as source area F) and the former Totem Equipment site (designated as source area G). The following reasons for both off-site source areas to be excluded as possible sources of vinyl chloride at the Federal Center South property include that:

- No vinyl chloride was detected above the test method reporting limit in the groundwater sample collected from well EHSI-MW10, located hydraulically upgradient from the highest vinyl chloride concentrations detected onsite, and hydraulically downgradient from these off-site sources;
- There is considerable lateral distances relative from both off-site source areas to the wells onsite, where detected vinyl chloride concentrations, particularly the highest concentrations, were found (greater than 630 feet away). Higher contaminant concentrations are generally interpreted that the source area is relatively close by; and

- Halogenated VOC concentrations detected in groundwater from the former Totem Equipment site were reportedly below regulatory cleanup levels (Ecology 2010).

9.0 CONCLUSIONS

Based on the results and findings of the Federal Center South, all readily identifiable and documented chemical contamination liabilities exist due to the presence of vinyl chloride and TCE in concentrations exceeding regulatory cleanup levels. Vinyl chloride is present in concentrations in excess of regulatory cleanup levels throughout the north, mid-central, and mid-west portions of the Federal Center South property. In addition, TCE in concentrations exceeding regulatory cleanup levels, exist in groundwater within the northeast portion of the Federal Center South property.

There appears to be a selective general east to west migration path for vinyl chloride in groundwater along the north portion of the Federal Center South property. The Federal Center South property is an historic estuary that was filled in to provide a shoreline. We believe that the vinyl chloride migration path is indicative of a former stream channel into the Duwamish River.

10.0 RECOMMENDATIONS

EHSI recommends that an estimate of hydraulic conductivity be made for groundwater wells FC-2, FC-3, and FC-7 to determine if vinyl chloride detected in these wells will impact the stormwater retention design for the Federal Center South property. We also recommend that an estimate of hydraulic conductivity be made for groundwater monitoring well FC-9. The hydraulic conductivity will be used to ascertain the likelihood of vinyl chloride detected in this wells to migrate into the Duwamish Waterway, located west and hydraulically down-gradient of the well.

11.0 REFERENCES

AMEC. 2010. NEPA Environmental Assessment – Redevelopment of Federal Center South Building 1202, 4735 East Marginal Way South, Seattle, Washington 98134. Report was prepared for the US General Services Administration by AMEC. February 24, 2010.

Ecology. 2001. Model Toxics Control Act Cleanup Levels and Risk Calculations (CLARC), Version 3.1. Washington State Department of Ecology, Toxics Cleanup Program. Ecology publication no. 94-145. Revised November 2001.

Ecology. 2007. Model Toxics Control Act (MTCA) Statute and Regulation – Model Toxics Control Act Chapter 70.105D Revised Code of Washington (RCW), Uniform Environmental Covenants Act Chapter 64.70 RCW, MTCA Cleanup Regulation Chapter 173-340 Washington Administrative Code (WAC). Washington State Department of Ecology, Toxics Cleanup Program. Ecology publication no. 94-06. Revised November 2007.

EHSI. 2010. Final Report – US General Services Administration (GSA), Federal Center South, Interim Soil Remediation and Site Assessment. Report was prepared for GSA by EHS-International, Inc. of Bellevue, Washington. October 12, 2010.

Google Earth. 2010. June 12, 2010 aerial photograph of the Federal Center South property and surrounding area. Obtained map coordinates for monitoring wells. Visited Google Earth website in November 2010: www.google.com.

King County. 2010. King County Interactive Mapping (iMAP) property information website. Parcel ID numbers and current property information, including owner, address, buildings (and built dates). Also reviewed a 1936 aerial photograph covering the subject property and surrounding area. Visited website October 2010: <http://www.kingcounty.gov/operations/gis/Maps/iMAP.aspx>

NARA. 2010. Reviewed textual records and maps at the National Archives and Records Administration, Pacific Alaska Region in Seattle, WA on November 2 and 3, 2010. The following records reviewed that covered Federal Center South (the record group [RG] and location [accession number, box #, location, and folder name]):

- RG 92 – Records of the Office of the Quartermaster General. Seattle General Depot, Administrative and Historical Files, 1940-1947. [Boxes 3 and 4, [314.7?]-314.7]. *Folders: 314.7 [Interim Report No. V – The Seattle Quartermaster Depot Expansion and Reorganization, 1940-1941], ca. 1943; and 314.7 [Interim Report No. XIII – The Seattle Depot Expansion and Reorganization 1941-1945, Part I: The Physical Expansion of the Seattle Depot 1941-1945]*. Descriptions of activities, maps, and photographs of buildings located within the northeast portion of the Federal Center South property. A 1943 aerial photograph was also in these records.
- RG 121 – Records of the Public Buildings Service, Real Property Division 10, Seattle, WA. Real Property Disposition Case Files 1958-1979. [Accession number 121-81-0003; Box 312; 8/47/4]. *Folders: G-WASH-806A, Screening: 8 Improvements, Federal Center South, Seattle, WA; G-WASH-806A, Inspection Report – Buildings, Federal Center South, Seattle, WA; G-WASH-806A, Sale by Bid: Federal Center South, Seattle, WA [2/2]; and G-WASH-806A, Report of Excess: Federal Center South, Seattle, WA, Off-Site Removals – 6 Buildings*. Maps showing locations of eight buildings, along with building descriptions and photographs for disposal.
- RG 270 – Records of the War Asset Administration, Regional Office. Real Property Case Files – Seattle General Depot. [Box 519, NW/16/7]. *Folders: #600 Seattle General Depot, 1-General, W-WASH-69, WD-1141; and #600 Seattle General Depot, #4 Acquisition and Classification, W-WASH-69, WD-1141*. US Army acquired properties east of Federal Center South and E. Marginal Way S. (including Petro Paint Mfg. Co. property).

Olender, Rich. November 9, 2010. Personal communications (onsite meeting with Rich Olender, Duane Allen [GSA Project Manager], KPFF Engineers, Hart Crowser, and EHSI representatives) regarding storage of hazardous substances by Boeing Company at the loading dock area north of Building 1202 during their tenancy onsite (1950s through 1970s). Mr. Olender is the General Contractor Supervisor for Sellen Construction at the GSA Federal Center South construction site.

PROACT. 2006. Success Story – Spotlight on: McGuire Air Force Base. An Environmental Resource sponsored by the HQ Air Force Center for Environmental Excellence. February 2006. Available online: <http://www.afcee.af.mil/shared/media/document/AFD-070925-034.pdf>.

Puget Sound Archives. 2010. Reviewed historical property assessment records of Federal Center South property and surrounding properties to the north, east, and southeast on

November 2, 2010. Washington State Archives, Puget Sound Regional Branch at Bellevue College, Washington.

UW. 2010a. University of Washington Map Collection. Historical aerial photographs reviewed (photo series; frame [if available]; scale; and aerial photograph publisher):

- 1944 Army COE, Scale 1:20,000, US Army Map Service
- 1946 Aerial Survey, Scale 1:4,800 (1 inch = 400 feet), Aerial Photo Publishers
- 1953 S53 10-5 frame, Scale 1:12,000
- 1961 mylar enlargements, Sec. 19, T24N, R4E; Scale 1:4,800 (1 inch = 400 feet), Pacific Aerial Surveys
- 1965 mylar enlargements, Sec. 19, T24N, R4E; Scale 1:4,800 (1 inch = 400 feet), Pacific Aerial Surveys
- 1970 enlargements, Sec. 19, T24N, R4E; Scale 1:4,800, Washington Department of Natural Resources
- 1974 NW-H-74 orthophotos, T24N, R4E; Scale 1:24,000, Washington Department of Natural Resources
- 1978 NW-78, 55B-60 frame, Scale 1:12,000, Washington Department of Natural Resources
- OS 83-84 enlargements, SW ¼ of T24N, R4E; Scale 1:12,000, Washington Department of Natural Resources
- NW-95 enlargements, Sec. 19, T24N, R4E; Scale 1:4,800, Washington Department of Natural Resources

UW. 2010b. Sanborn fire insurance maps of Seattle, WA on microfilm. University of Washington Microfilm Library. Sanborn maps for the east side of Duwamish Waterway cover in Volume 8.

- A7766, Reel 12, 1929, pages 829, 833, 892, and 893
- A7766, Reel 14, 1948, pages 815, 829, 833, and 892
- A9645, Reel 6, 1967, pages 813, 815

UW. 2010c. Polk's Seattle City Directory reviewed at the University of Washington, Special Collections Library. Reviewed 1918, 1919, 1920, 1921, 1922, 1924, 1926, 1931, 1934, 1938, 1942, 1948-49, 1958, and 1966.

UW. 2010d. Kroll's Atlas of Seattle and King County reviewed at the University of Washington, Special Collections Library. Reviewed 1920, 1946, 1950, 1958, 1960, 1966, 1971, and 1987.

12.0 SIGNATURES

The undersigned prepared the Interim Soil Remediation and Site Assessment Final Report.




Miguel A. Ortega, L.G.
Washington Licensed Geologist

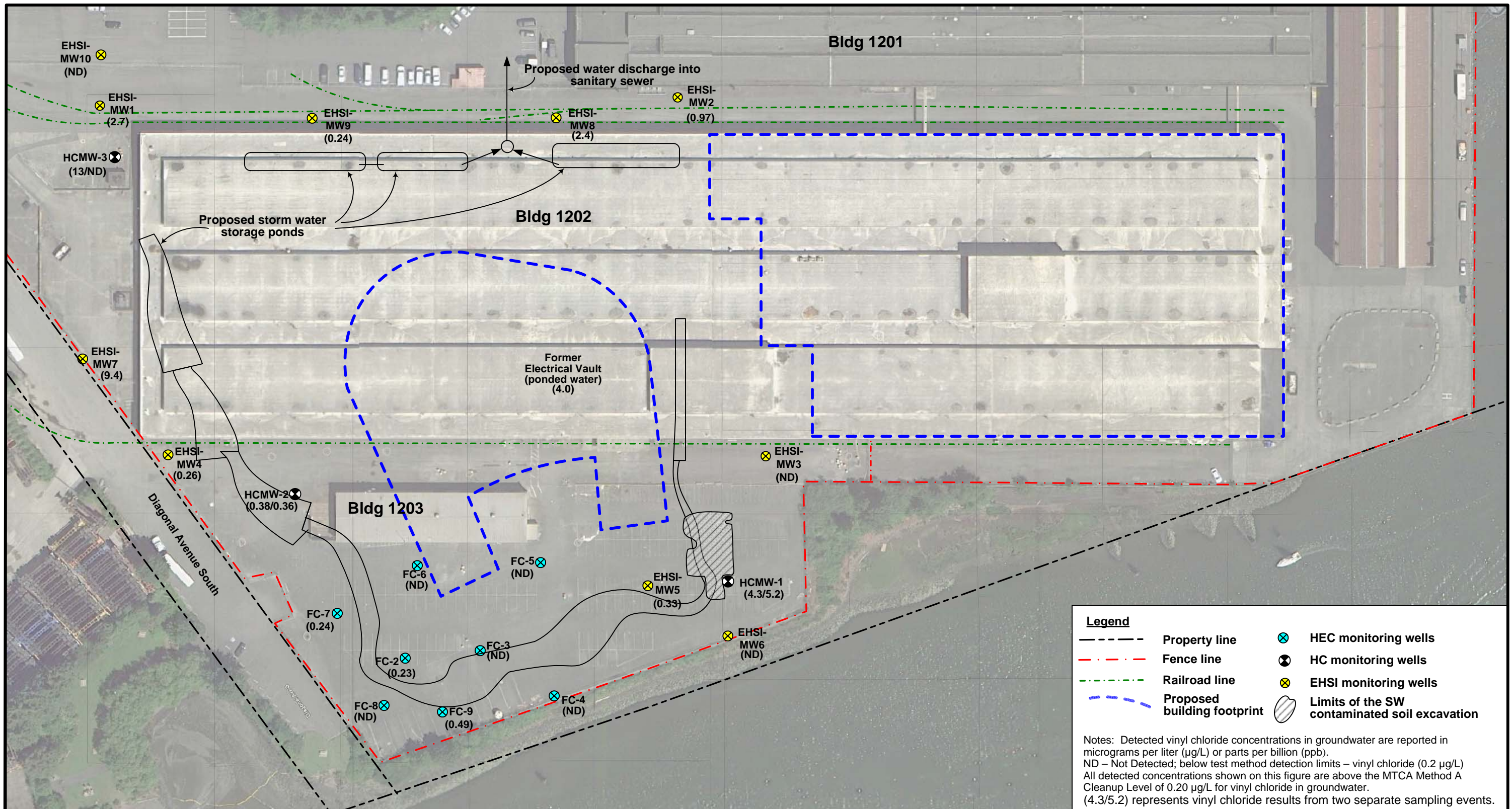
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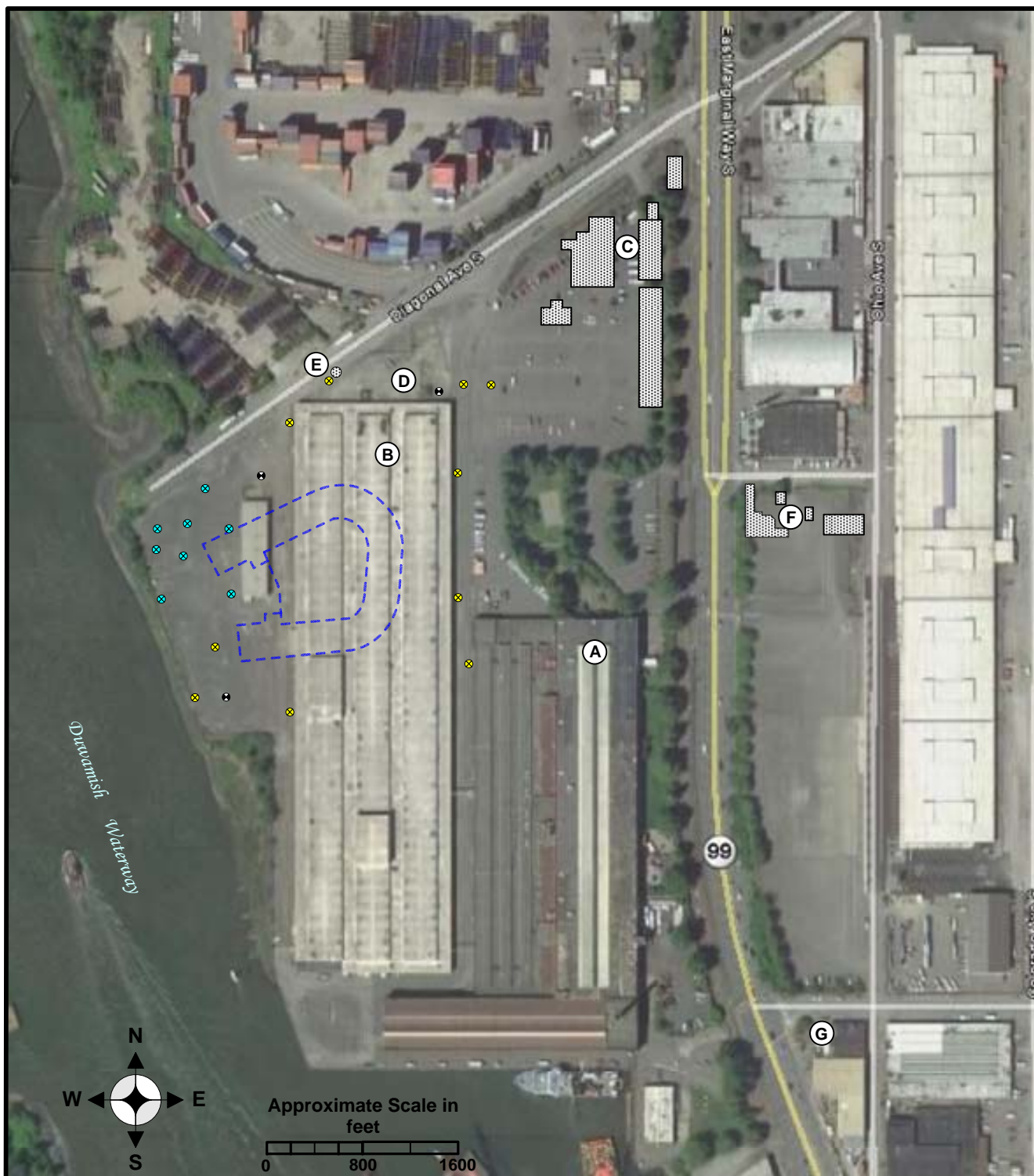
13.0 PROJECT LIMITATIONS

The conclusions presented in report are professional opinions based upon our visual observations and physical testing. This report is intended exclusively for the purpose outline herein and at the site location and project indicated. This report is for the sole use of our client, GSA. Opinions and conclusions presented herein apply to site conditions existing at the time of execution of our Groundwater Monitoring Assessment Report and do not necessarily apply to future changes or other prior conditions at the site of which EHSI is not aware and has not had the opportunity to evaluate. The scope of services performed in execution of this Groundwater Monitoring Assessment may not be appropriate to satisfy the needs of other users, and any use or re-use of the document or the findings, conclusions, or recommendations presented is at the sole risk of the said user.

EHSI's objective is to perform our work with care, exercising the customary thoroughness and competence of environmental consulting professionals in the relevant disciplines. Furthermore, we carried out our services in accordance with the standard for professional services by a consulting firm at the time those services were rendered. It is important to recognize that even the most comprehensive scope of services may fail to detect environmental liability on a particular site. Therefore, EHSI cannot act as insurers and cannot "certify or underwrite" that a site is totally free of environmental liability. In addition, no expressed or implied representation or warranty is included or intended in our report except that our work was performed within the limits prescribed by our client, and with the customary thoroughness and competence of our profession.

FIGURES





Key:

- ✕ ✕ ✕ Groundwater monitoring wells (EHSI/Herrera/HC)
- Former buildings
- Proposed building footprint

Potential Contamination Source Areas:

- | | |
|---|--|
| <p>(A) Former garage used during vehicle assembly and missile manufacturing.</p> <p>(B) Storage of dry-cleaning supplies in Bldg 1202.</p> <p>(C) Former property and vehicle maintenance shops.</p> <p>(D) Drums and hazardous substances stored on loading dock area.</p> | <p>(E) A tall AST of unknown contents.</p> <p>(F) Historical paint manufacturing plant.</p> <p>(G) Former Totem Equipment.</p> |
|---|--|

Figure 3
Potential Contamination Source Areas
Groundwater Monitoring Assessment
GSA Federal Center South
4735 E. Marginal Way South
Seattle, Washington 98134

December 2010

TABLES

TABLE 1. GROUNDWATER ANALYTICAL RESULTS		
Sample ID	Month/Year Date Sampled	VOCs ^a
EHSI-MW1	September 2010 ^f	VC – 2.7 ^{b, c} cis DCE – 14 trans DCE – 14
EHSI-MW2	September 2010 ^f	VC – 0.97 Benzene – 5.1
EHSI-MW3	September 2010 ^f	ND ^d
EHSI-MW4	September 2010 ^f	VC – 0.26
EHSI-MW5	November 2010	VC – 0.33
EHSI-MW6	November 2010	ND
EHSI-MW7	November 2010	VC – 9.4 TCE – 44 cis DCE – 55
EHSI-MW8	November 2010	VC – 2.5 TCE – 2.9 cis DCE – 6.9
EHSI-MW9	November 2010	VC – 0.24
EHSI-MW10	November 2010	ND
FC-2	November 2010	VC – 0.23
FC-3	November 2010	ND
FC-4	October 2010 ^f	ND
FC-5	October 2010 ^f	ND
FC-6	October 2010 ^f	ND
FC-7	October 2010 ^f	VC – 0.27
FC-8	November 2010	ND
FC-9	November 2010	VC – 0.49
HCMW-1	May 2010 ^f	VC – 4.3
	October 2010 ^f	VC – 3.4
	November 2010	VC – 5.2
HCMW-2	May 2010 ^f	ND
	October 2010 ^f	VC – 0.38
	November 2010	VC – 0.36
HCMW-3	May 2010 ^f	VC – 13 TCE – 6.2 cis DCE – 5.4 trans DCE – 2.1
	November 2010	ND

TABLE 1. GROUNDWATER ANALYTICAL RESULTS – CONT.		
Sample ID	Month/Year Date Sampled	VOCs ^a
FCS-1202EX	November 2010	VC – 4.0
<i>Washington MTCA Method A and B Cleanup Levels for Groundwater ^e</i>		<i>VC – 0.20</i> <i>TCE – 5.0</i> <i>cis DCE – 80</i> <i>trans DCE – 160</i> <i>Benzene – 5.0</i>

EXPLANATION

cis DCE = cis 1,2 dichloroethene; trans DCE = trans 1,2 dichloroethene; TCE = trichloroethylene; VC = vinyl chloride; VOCs = volatile organic compounds.

^a All water samples were analyzed for the presence of VOCs in groundwater using EPA Test Method 8260C.

^b Values reported in micrograms per liter (µg/L); equivalent to parts per billion (ppb).

^c Values shown in **bold** typeface exceeded the regulatory cleanup level.

^d ND - Not Detected, below test method detection limit for vinyl chloride (0.20 µg/L); TCE (1 µg/L); cis DCE (1 µg/L); trans DCE (1 µg/L).

^e MTCA - Washington Model Toxics Control Act (MTCA) Method A Groundwater Cleanup Levels (Ecology 2007) and MTCA (Method B Groundwater) Cleanup Levels and Risk Calculations (Ecology 2001).

^f Source: EHSI 2010 (May, September, and October 2010 groundwater analytical results).

TABLE 2. MAP COORDINATES AND STATIC GROUNDWATER LEVEL MEASUREMENTS				
Monitoring Well ID	Map Coordinates ^a		Month/Year Date Last Monitored	Static Water Level Measurements (feet below TOC)
	Latitude	Longitude		
EHSI 2010 Groundwater Monitoring Wells				
EHSI-MW1	47° 33.650' N	122° 20.485' W	October 2010	6.60
EHSI-MW2	47° 33.562' N	122° 20.483' W	October 2010	9.34
EHSI-MW3	47° 33.548' N	122° 20.569' W	October 2010	7.70
EHSI-MW4	47° 33.638' N	122° 20.569' W	October 2010	5.90
EHSI-MW5	47° 33.556' N	122° 20.601' W	November 2010	5.35
EHSI-MW6	47° 33.546' N	122° 20.614' W	November 2010	6.19
EHSI-MW7	47° 33.648' N	122° 20.549' W	November 2010	5.51
EHSI-MW8	47° 33.575' N	122° 20.488' W	November 2010	7.29
EHSI-MW9	47° 33.620' N	122° 20.488' W	November 2010	5.75
EHSI-MW10	47° 33.647' N	122° 20.472' W	November 2010	5.77
HEC Groundwater Monitoring Wells				
FC-2	47° 33.605' N	122° 20.612' W	November 2010	6.02
FC-3	47° 33.587' N	122° 20.616' W	November 2010	5.22
FC-4	47° 33.575' N	122° 20.629' W	October 2010	6.32
FC-5	47° 33.577' N	122° 20.595' W	October 2010	5.25
FC-6	47° 33.600' N	122° 20.597' W	October 2010	4.70
FC-7	47° 33.612' N	122° 20.612' W	October 2010	5.08
FC-8	47° 33.603' N	122° 20.629' W	November 2010	6.00
FC-9	47° 33.593' N	122° 20.629' W	November 2010	5.62
HC Groundwater Monitoring Wells				
HCMW-1	47° 33.547' N	122° 20.600' W	November 2010	4.15
HCMW-2	47° 33.615' N	122° 20.583' W	November 2010	5.94
HCMW-3	47° 33.645' N	122° 20.496' W	November 2010	4.57

TOC = top of well casing.

^a Source: Google Earth 2010 (map coordinates).

APPENDIX A: COPIES OF LABORATORY ANALYTICAL REPORTS

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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October 13, 2010

Miguel Ortega, Project Manager
EHSI
13228 NE 20th St., Suite 100
Bellevue, WA 98005

Dear Mr. Ortega:

Included are the results from the testing of material submitted on October 4, 2010 from the Federal Center South VOCs PO 10134-02, F&BI 010042 project. There are 13 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
EHS1013R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 4, 2010 by Friedman & Bruya, Inc. from the EHSI Federal Center South VOCs PO 10134-02, F&BI 010042 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>EHSI</u>
010042-01	HCMW-2
010042-02	FC7
010042-03	FC6
010042-04	FC4
010042-05	FC5
010042-06	HCMW-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/13/10

Date Received: 10/04/10

Project: Federal Center South VOCs PO 10134-02, F&BI 010042

Date Extracted: 10/06/10

Date Analyzed: 10/06/10

**RESULTS FROM THE ANALYSIS OF WATER SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported as ug/L (ppb)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 51-134)
FC6 010042-03	<100	83
Method Blank 00-1596 MB	<100	83

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-2	Client:	EHSI
Date Received:	10/04/10	Project:	Federal Center South VOCs PO 10134-02
Date Extracted:	10/05/10	Lab ID:	010042-01
Date Analyzed:	10/05/10	Data File:	100512.D
Matrix:	Water	Instrument:	GCMS5
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	63	127
Toluene-d8	96	65	127
4-Bromofluorobenzene	86	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	0.38	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC7	Client:	EHSI
Date Received:	10/04/10	Project:	Federal Center South VOCs PO 10134-02
Date Extracted:	10/05/10	Lab ID:	010042-02
Date Analyzed:	10/05/10	Data File:	100513.D
Matrix:	Water	Instrument:	GCMS5
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	63	127
Toluene-d8	97	65	127
4-Bromofluorobenzene	88	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	0.24	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC6	Client:	EHSI
Date Received:	10/04/10	Project:	Federal Center South VOCs PO 10134-02
Date Extracted:	10/05/10	Lab ID:	010042-03
Date Analyzed:	10/05/10	Data File:	100514.D
Matrix:	Water	Instrument:	GCMS5
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	92	63	127
Toluene-d8	96	65	127
4-Bromofluorobenzene	85	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID: FC4	Client: EHSI
Date Received: 10/04/10	Project: Federal Center South VOCs PO 10134-02
Date Extracted: 10/05/10	Lab ID: 010042-04
Date Analyzed: 10/05/10	Data File: 100515.D
Matrix: Water	Instrument: GCMS5
Units: ug/L (ppb)	Operator: JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	63	127
Toluene-d8	96	65	127
4-Bromofluorobenzene	88	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID: FC5	Client: EHSI
Date Received: 10/04/10	Project: Federal Center South VOCs PO 10134-02
Date Extracted: 10/05/10	Lab ID: 010042-05
Date Analyzed: 10/05/10	Data File: 100516.D
Matrix: Water	Instrument: GCMS5
Units: ug/L (ppb)	Operator: JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	88	63	127
Toluene-d8	96	65	127
4-Bromofluorobenzene	88	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-1	Client:	EHSI
Date Received:	10/04/10	Project:	Federal Center South VOCs PO 10134-02
Date Extracted:	10/05/10	Lab ID:	010042-06
Date Analyzed:	10/05/10	Data File:	100517.D
Matrix:	Water	Instrument:	GCMS5
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	63	127
Toluene-d8	98	65	127
4-Bromofluorobenzene	85	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	3.4	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	1.6
Acetone	17	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	4.6
Methylene chloride	<5	o-Xylene	16
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	4.7	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	2.6
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	12
1,1-Dichloropropene	<1	4-Chlorotoluene	11
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	0.62	1,2,4-Trimethylbenzene	6.2
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	3.0	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	1.1	Naphthalene	2.6
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID: Method Blank	Client: EHSI
Date Received: Not Applicable	Project: Federal Center South VOCs PO 10134-02
Date Extracted: 10/05/10	Lab ID: 001525 mb
Date Analyzed: 10/05/10	Data File: 100509.D
Matrix: Water	Instrument: GCMS5
Units: ug/L (ppb)	Operator: JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	63	127
Toluene-d8	97	65	127
4-Bromofluorobenzene	89	69	127

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
Methyl t-butyl ether (MTBE)	<1	Styrene	<1
trans-1,2-Dichloroethene	<1	Isopropylbenzene	<1
1,1-Dichloroethane	<1	Bromoform	<1
2,2-Dichloropropane	<1	n-Propylbenzene	<1
cis-1,2-Dichloroethene	<1	Bromobenzene	<1
Chloroform	<1	1,3,5-Trimethylbenzene	<1
2-Butanone (MEK)	<10	1,1,2,2-Tetrachloroethane	<1
1,2-Dichloroethane (EDC)	<1	1,2,3-Trichloropropane	<1
1,1,1-Trichloroethane	<1	2-Chlorotoluene	<1
1,1-Dichloropropene	<1	4-Chlorotoluene	<1
Carbon tetrachloride	<1	tert-Butylbenzene	<1
Benzene	<0.35	1,2,4-Trimethylbenzene	<1
Trichloroethene	<1	sec-Butylbenzene	<1
1,2-Dichloropropane	<1	p-Isopropyltoluene	<1
Bromodichloromethane	<1	1,3-Dichlorobenzene	<1
Dibromomethane	<1	1,4-Dichlorobenzene	<1
4-Methyl-2-pentanone	<10	1,2-Dichlorobenzene	<1
cis-1,3-Dichloropropene	<1	1,2-Dibromo-3-chloropropane	<10
Toluene	<1	1,2,4-Trichlorobenzene	<1
trans-1,3-Dichloropropene	<1	Hexachlorobutadiene	<1
1,1,2-Trichloroethane	<1	Naphthalene	<1
2-Hexanone	<10	1,2,3-Trichlorobenzene	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/13/10

Date Received: 10/04/10

Project: Federal Center South VOCs PO 10134-02, F&BI 010042

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR
AND TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 010042-03 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	92	69-134

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/13/10

Date Received: 10/04/10

Project: Federal Center South VOCs PO 10134-02, F&BI 010042

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 010042-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Dichlorodifluoromethane	ug/L (ppb)	50	<10	91	28-164
Chloromethane	ug/L (ppb)	50	<10	82	26-167
Vinyl chloride	ug/L (ppb)	50	3.4	92	37-171
Bromomethane	ug/L (ppb)	50	<1	94	24-165
Chloroethane	ug/L (ppb)	50	<1	96	10-172
Trichlorofluoromethane	ug/L (ppb)	50	<1	106	30-199
Acetone	ug/L (ppb)	250	17	63	19-168
1,1-Dichloroethene	ug/L (ppb)	50	<1	97	35-149
Methylene chloride	ug/L (ppb)	50	<5	95	61-124
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	<1	93	49-139
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	95	65-128
1,1-Dichloroethane	ug/L (ppb)	50	<1	96	67-127
2,2-Dichloropropane	ug/L (ppb)	50	<1	96	23-163
cis-1,2-Dichloroethene	ug/L (ppb)	50	4.7	99	65-139
Chloroform	ug/L (ppb)	50	<1	97	71-127
2-Butanone (MEK)	ug/L (ppb)	250	<10	70	47-162
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	96	68-132
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	102	63-135
1,1-Dichloropropene	ug/L (ppb)	50	<1	101	65-127
Carbon tetrachloride	ug/L (ppb)	50	<1	105	55-139
Benzene	ug/L (ppb)	50	0.62	96	62-144
Trichloroethene	ug/L (ppb)	50	<1	98	68-134
1,2-Dichloropropane	ug/L (ppb)	50	<1	98	73-130
Bromodichloromethane	ug/L (ppb)	50	<1	102	65-135
Dibromomethane	ug/L (ppb)	50	<1	96	65-135
4-Methyl-2-pentanone	ug/L (ppb)	250	<10	81	56-143
cis-1,3-Dichloropropene	ug/L (ppb)	50	<1	101	55-146
Toluene	ug/L (ppb)	50	3.0	98	68-131
trans-1,3-Dichloropropene	ug/L (ppb)	50	<1	104	63-147
1,1,2-Trichloroethane	ug/L (ppb)	50	1.1	95	63-143
2-Hexanone	ug/L (ppb)	250	<10	83	51-149
1,3-Dichloropropane	ug/L (ppb)	50	<1	97	72-126
Tetrachloroethene	ug/L (ppb)	50	<1	99	64-132
Dibromochloromethane	ug/L (ppb)	50	<1	108	65-135
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	<1	96	77-127
Chlorobenzene	ug/L (ppb)	50	<1	98	72-118
Ethylbenzene	ug/L (ppb)	50	1.6	103	51-150
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	<1	106	72-129
m,p-Xylene	ug/L (ppb)	100	4.6	104	72-137
o-Xylene	ug/L (ppb)	50	16	108 b	67-133
Styrene	ug/L (ppb)	50	<1	106	73-126
Isopropylbenzene	ug/L (ppb)	50	<1	113	65-135
Bromoform	ug/L (ppb)	50	<1	104	60-136
n-Propylbenzene	ug/L (ppb)	50	<1	95	66-133
Bromobenzene	ug/L (ppb)	50	<1	91	70-129
1,3,5-Trimethylbenzene	ug/L (ppb)	50	2.6	97	72-130
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	<1	78	65-137
1,2,3-Trichloropropane	ug/L (ppb)	50	<1	75	66-135
2-Chlorotoluene	ug/L (ppb)	50	12	91 b	62-131
4-Chlorotoluene	ug/L (ppb)	50	11	92 b	62-132
tert-Butylbenzene	ug/L (ppb)	50	<1	96	64-135
1,2,4-Trimethylbenzene	ug/L (ppb)	50	6.2	98	69-139
sec-Butylbenzene	ug/L (ppb)	50	<1	98	64-134
p-Isopropyltoluene	ug/L (ppb)	50	<1	100	69-134
1,3-Dichlorobenzene	ug/L (ppb)	50	<1	89	65-126
1,4-Dichlorobenzene	ug/L (ppb)	50	<1	90	65-121
1,2-Dichlorobenzene	ug/L (ppb)	50	<1	92	64-128
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	<10	78	54-133
1,2,4-Trichlorobenzene	ug/L (ppb)	50	<1	98	63-141
Hexachlorobutadiene	ug/L (ppb)	50	<1	88	53-140
Naphthalene	ug/L (ppb)	50	2.6	95	40-166
1,2,3-Trichlorobenzene	ug/L (ppb)	50	<1	95	55-148

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/13/10

Date Received: 10/04/10

Project: Federal Center South VOCs PO 10134-02, F&BI 010042

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Dichlorodifluoromethane	ug/L (ppb)	50	99	97	27-138	2
Chloromethane	ug/L (ppb)	50	93	97	49-125	4
Vinyl chloride	ug/L (ppb)	50	98	97	53-131	1
Bromomethane	ug/L (ppb)	50	99	97	62-148	2
Chloroethane	ug/L (ppb)	50	98	95	30-176	3
Trichlorofluoromethane	ug/L (ppb)	50	102	100	65-172	2
Acetone	ug/L (ppb)	250	94	86	32-177	9
1,1-Dichloroethene	ug/L (ppb)	50	97	97	68-131	0
Methylene chloride	ug/L (ppb)	50	97	97	17-177	0
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	102	103	54-156	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	99	98	71-128	1
1,1-Dichloroethane	ug/L (ppb)	50	101	99	74-118	2
2,2-Dichloropropane	ug/L (ppb)	50	112	108	65-150	4
cis-1,2-Dichloroethene	ug/L (ppb)	50	103	104	74-126	1
Chloroform	ug/L (ppb)	50	103	100	76-118	3
2-Butanone (MEK)	ug/L (ppb)	250	101	93	52-152	8
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	100	100	77-118	0
1,1,1-Trichloroethane	ug/L (ppb)	50	106	106	77-123	0
1,1-Dichloropropene	ug/L (ppb)	50	107	107	75-122	0
Carbon tetrachloride	ug/L (ppb)	50	110	107	76-126	3
Benzene	ug/L (ppb)	50	101	101	77-121	0
Trichloroethene	ug/L (ppb)	50	102	102	74-119	0
1,2-Dichloropropane	ug/L (ppb)	50	103	103	77-121	0
Bromodichloromethane	ug/L (ppb)	50	107	106	77-129	1
Dibromomethane	ug/L (ppb)	50	105	103	79-121	2
4-Methyl-2-pentanone	ug/L (ppb)	250	105	100	65-135	5
cis-1,3-Dichloropropene	ug/L (ppb)	50	110	108	79-129	2
Toluene	ug/L (ppb)	50	104	104	81-113	0
trans-1,3-Dichloropropene	ug/L (ppb)	50	112	111	90-128	1
1,1,2-Trichloroethane	ug/L (ppb)	50	103	101	89-113	2
2-Hexanone	ug/L (ppb)	250	106	99	58-160	7
1,3-Dichloropropane	ug/L (ppb)	50	105	104	89-113	1
Tetrachloroethene	ug/L (ppb)	50	106	105	85-121	1
Dibromochloromethane	ug/L (ppb)	50	115	113	89-128	2
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	108	105	88-122	3
Chlorobenzene	ug/L (ppb)	50	103	101	86-118	2
Ethylbenzene	ug/L (ppb)	50	108	106	83-116	2
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	110	106	86-124	4
m,p-Xylene	ug/L (ppb)	100	108	107	84-120	1
o-Xylene	ug/L (ppb)	50	111	111	83-120	0
Styrene	ug/L (ppb)	50	110	110	87-119	0
Isopropylbenzene	ug/L (ppb)	50	116	115	83-120	1
Bromoform	ug/L (ppb)	50	117	112	77-119	4
n-Propylbenzene	ug/L (ppb)	50	103	98	83-118	5
Bromobenzene	ug/L (ppb)	50	97	95	88-117	2
1,3,5-Trimethylbenzene	ug/L (ppb)	50	103	99	85-121	4
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	94	89	83-115	5
1,2,3-Trichloropropane	ug/L (ppb)	50	92	86	83-114	7
2-Chlorotoluene	ug/L (ppb)	50	100	96	81-116	4
4-Chlorotoluene	ug/L (ppb)	50	99	96	83-117	3
tert-Butylbenzene	ug/L (ppb)	50	105	101	84-118	4
1,2,4-Trimethylbenzene	ug/L (ppb)	50	105	101	86-119	4
sec-Butylbenzene	ug/L (ppb)	50	105	101	84-121	4
p-Isopropyltoluene	ug/L (ppb)	50	107	102	85-118	5
1,3-Dichlorobenzene	ug/L (ppb)	50	96	93	85-118	3
1,4-Dichlorobenzene	ug/L (ppb)	50	96	92	85-119	4
1,2-Dichlorobenzene	ug/L (ppb)	50	98	94	81-117	4
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	108	96	62-136	12
1,2,4-Trichlorobenzene	ug/L (ppb)	50	103	100	75-129	3
Hexachlorobutadiene	ug/L (ppb)	50	100	94	72-138	6
Naphthalene	ug/L (ppb)	50	107	101	66-135	6
1,2,3-Trichlorobenzene	ug/L (ppb)	50	101	97	70-133	4

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 - More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

✓✓

Page # 1 of 1

TURNAROUND TIME

☐ Standard (2 Weeks)

☒ RUSH 18 HRS.

Rush charges authorized by: _____

SAMPLE DISPOSAL

☒ Dispose after 30 days

☐ Return samples

☐ Will call with instructions

[illegible]

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Yelena Aravkina, M.S.
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November 19, 2010

Miguel Ortega, Project Manager
EHSI
13228 NE 20th St., Suite 100
Bellevue, WA 98005

Dear Mr. Ortega:

Included are the results from the testing of material submitted on November 16, 2010 from the 10048-12C Federal Center South, F&BI 011210 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Shelby Nelson, Diana Phelan
EHS1119R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 16, 2010 by Friedman & Bruya, Inc. from the EHSI 10048-12C Federal Center South, F&BI 011210 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>EHSI</u>
011210-01	EHSI-MW5
011210-02	FC9
011210-03	FC8
011210-04	FC2
011210-05	EHSI-MW7
011210-06	EHSI-MW8
011210-07	EHSI-MW9
011210-08	EHSI-MW10
011210-09	EHSI-MW6
011210-10	HCMW-1
011210-11	HCMW-2
011210-12	HCMW-3

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW5	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-01
Date Analyzed:	11/17/10	Data File:	111622.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.33

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC9	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-02
Date Analyzed:	11/17/10	Data File:	111623.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.49

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC8	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-03
Date Analyzed:	11/17/10	Data File:	111624.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	103	60	129
4-Bromofluorobenzene	101	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC2	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-04
Date Analyzed:	11/17/10	Data File:	111625.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.23

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW7	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-05
Date Analyzed:	11/17/10	Data File:	111626.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	9.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW8	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-06
Date Analyzed:	11/17/10	Data File:	111627.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW9	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-07
Date Analyzed:	11/17/10	Data File:	111633.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.24

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW10	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-08
Date Analyzed:	11/17/10	Data File:	111634.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW6	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-09
Date Analyzed:	11/17/10	Data File:	111635.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-1	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-10
Date Analyzed:	11/17/10	Data File:	111636.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	104	60	129
4-Bromofluorobenzene	94	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	5.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-2	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-11
Date Analyzed:	11/17/10	Data File:	111637.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	100	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.36

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-3	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-12
Date Analyzed:	11/17/10	Data File:	111638.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	63	127
Toluene-d8	104	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	EHSI
Date Received:	Not Applicable	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	001863 mb
Date Analyzed:	11/17/10	Data File:	111632.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/19/10

Date Received: 11/16/10

Project: 10048-12C Federal Center South, F&BI 011210

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 011210-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.33	115	36-166

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	94	92	50-154	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 - More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

011210

SAMPLE CHAIN OF CUSTODY

ME

11-16-10

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Page # 1 of 2

Send Report To MICHAEL CRTEGAH

Company EHS-INTERNATIONAL, INC.

Address 13228 NE 30th ST, #100

City, State, ZIP BELLEVUE, WA 98005

Phone # 425-455-2459 Fax # 425-646-7247

SAMPLERS (signature) *Michael Crtegh*
 PROJECT NAME/NO. *FEDERAL CENTER SOUTH*
610 MONTGOMERY - VC

PO #
 10045-
 132

REMARKS

* VINYL CHLORIDE

TURNAROUND TIME
☐ Standard (2 Weeks)
☒ RUSH 48 HRS TAT
 Rush charges authorized by:

SAMPLE DISPOSAL

☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	ANALYSES REQUESTED							Notes		
						TPH-Diesel	TPH-Gasoline	BTEX by 8021B	*VOCs by 8260	SVOCs by 8270	HFS				
EH51-MU05	01A	11/15/10	08:28	WATER	DMF 43				X						
EC9	62		09:40	WATER	3				X						
EC8	03		10:35	WATER	3				X						
EC2	04		11:15	WATER	3				X						
EH51-MU07	05		12:55	WATER	3				X						
EH51-MU08	06		13:44	WATER	3				X						
EH51-MU09	07		14:35	WATER	3				X						
EH51-MU10	08		15:28	WATER	3				X						
EH51-MU10	04	✓	15:53	WATER	3				X						
HEMU-1	10	11/16/10	09:30	WATER	3				X						

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2020

Ph. (206) 285-8282

Fax (206) 283-6044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Requested by <i>Diana M. PHELAN</i>	DIANA M. PHELAN	EH51	11/16/10	13:43
Received by <i>Michael Crtegh</i>	Michael Crtegh	EH51	11/16/10	13:43
Received by				
Received by				
Received by				

Samples received at 6 °C

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Page No. 2 of 2

TURNAROUND TIME:
Standard (7 Weeks)
X RUSH 45 HRS TA
Rush charges authorized by:

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

[illegible]

FORMS: C:\OC\DOC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <i>[Signature]</i>	DAVIDA M. STEAR	EHSI	11/14/10	13:43
Received by: <i>[Signature]</i>	THOMAS BOYD	F&B	11/16/10	13:43
Relinquished by:				
Received by:				

Samples received at 6 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Charlene Morrow, M.S.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
FAX: (206) 283-5044
e-mail: fbi@isomedia.com

November 19, 2010

Miguel Ortega, Project Manager
EHSI
13228 NE 20th St., Suite 100
Bellevue, WA 98005

Dear Mr. Ortega:

Included are the results from the testing of material submitted on November 16, 2010 from the 10048-12C Federal Center South, F&BI 011210 project. There are 16 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Shelby Nelson, Diana Phelan
EHS1119R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 16, 2010 by Friedman & Bruya, Inc. from the EHSI 10048-12C Federal Center South, F&BI 011210 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>EHSI</u>
011210-01	EHSI-MW5
011210-02	FC9
011210-03	FC8
011210-04	FC2
011210-05	EHSI-MW7
011210-06	EHSI-MW8
011210-07	EHSI-MW9
011210-08	EHSI-MW10
011210-09	EHSI-MW6
011210-10	HCMW-1
011210-11	HCMW-2
011210-12	HCMW-3

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW5	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-01
Date Analyzed:	11/17/10	Data File:	111622.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.33

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC9	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-02
Date Analyzed:	11/17/10	Data File:	111623.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.49

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC8	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-03
Date Analyzed:	11/17/10	Data File:	111624.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	103	60	129
4-Bromofluorobenzene	101	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	FC2	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-04
Date Analyzed:	11/17/10	Data File:	111625.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.23

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW7	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-05
Date Analyzed:	11/17/10	Data File:	111626.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	102	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	9.4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW8	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-06
Date Analyzed:	11/17/10	Data File:	111627.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	101	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW9	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-07
Date Analyzed:	11/17/10	Data File:	111633.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.24

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW10	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-08
Date Analyzed:	11/17/10	Data File:	111634.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	63	127
Toluene-d8	100	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	EHSI-MW6	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-09
Date Analyzed:	11/17/10	Data File:	111635.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	97	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-1	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-10
Date Analyzed:	11/17/10	Data File:	111636.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	63	127
Toluene-d8	104	60	129
4-Bromofluorobenzene	94	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	5.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-2	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-11
Date Analyzed:	11/17/10	Data File:	111637.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	100	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.36

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	HCMW-3	Client:	EHSI
Date Received:	11/16/10	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	011210-12
Date Analyzed:	11/17/10	Data File:	111638.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	63	127
Toluene-d8	104	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	EHSI
Date Received:	Not Applicable	Project:	10048-12C Federal Center South
Date Extracted:	11/16/10	Lab ID:	001863 mb
Date Analyzed:	11/17/10	Data File:	111632.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	63	127
Toluene-d8	102	60	129
4-Bromofluorobenzene	98	51	145

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/19/10

Date Received: 11/16/10

Project: 10048-12C Federal Center South, F&BI 011210

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER
SAMPLES FOR VOLATILES BY EPA METHOD 8260C**

Laboratory Code: 011210-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.33	115	36-166

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	94	92	50-154	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 - More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr - The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

011210

SAMPLE CHAIN OF CUSTODY

ME

11-16-10

14

Page # 1 of 2

Send Report To MICHEL CRTEGA

Company EHS-INTERNATIONAL, INC.

Address 13228 NE 30th ST, #100

City, State, ZIP BELLEVUE, WA 98005

Phone # 425-455-2459 Fax # 425-646-7247

SAMPLERS (signature) *Alana M. PHELAN*
 PROJECT NAME/NO. FEDERAL CENTER SOUTH
 610 MONTGOMERY - VC

PO # 10045-
 132C

REMARKS

* VINYL CHLORIDE

TURNAROUND TIME
☐ Standard (2 Weeks)
☒ RUSH 48 HRS TAT
 Rush charges authorized by:

SAMPLE DISPOSAL

☒ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

						ANALYSES REQUESTED												
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	*VOCs by 8260	SVOCs by 8270	HFS							Notes
EH51-MU05	01A	11/15/10	08:28	WATER	DMF 43				X									
FC9	62		09:40	WATER	3				X									
FC8	03		10:35	WATER	3				X									
FC2	04		11:15	WATER	3				X									
EH51-MU07	05		12:55	WATER	3				X									
EH51-MU08	06		13:44	WATER	3				X									
EH51-MU09	07		14:35	WATER	3				X									
EH51-MU10	08		15:28	WATER	3				X									
EH51-MU10	04	✓	15:53	WATER	3				X									
HEMU-1	10	11/16/10	09:30	WATER	3				X									

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2020

Ph. (206) 285-8282

Fax (206) 283-6044

FORM 8-COC-COC-DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Requested by <i>Alana M. PHELAN</i>	DIANA M. PHELAN	EH51	11/16/10	13:43
Received by <i>Alana M. PHELAN</i>	Alana M. PHELAN	EH51	11/16/10	13:43
Inspected by				
Released by				

Samples received at 6 °C

44

Phone # 425-425-2939 Fax # 425-646-7247

* VINYL CHLORIDE

- 1) Dispose after 30 days
- 2) Return samples
- 3) Will call with instructions

[illegible]

FORMS (COC/COG.DOC)

Received by:

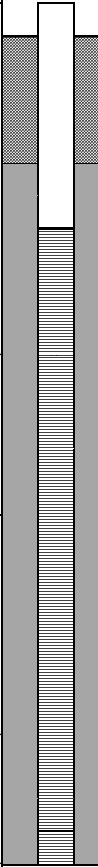
Samples received at	6°C
---------------------	-----

APPENDIX B: BORING LOGS AND WELL CONSTRUCTION DETAILS

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW5
Total depth 16 feet
Sheet 1 of 1

Project name <u>Federal Ctr. S.</u>	Drilling Contractor <u>Pacific NW Probe</u>	Drilling method <u>Driven push probe</u>
Project number <u>10048-12c</u>	Location <u>Approx. 35 feet N of the NW</u>	Sampling method <u>4-foot lined probe sampler</u>
Client <u>GSA</u>	<u>corner of the SW excavation</u>	Ground elevation <u>N/A</u>
EHSI rep. <u>D. Phelan</u>	Start date <u>11-10-2010</u>	Air monitoring (Y/N) <u>Yes</u>
WDOE Tag No. <u>BCA-225</u>	Compl. date <u>11-10-2010</u>	Instrument(s) <u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details	
Not measured	4-foot probe sampler	No recovery	1	▽		Asphalt and crushed rock		
			2		SP	Dark grayish brown fine-grained SAND with some medium-grained sand, moist		
			3					
			4					
3.2	4-foot probe sampler	65	5		SP	Groundwater encountered during drilling at approximately 6 ft bgs		
			6					
			7					
			8					
Not measured	4-foot probe sampler	100	9		ML/OL	Very dark grayish brown (2.5Y 3/2) SILT/ORGANIC SILT, with some clay, moist to wet		
			10					
			11					
			12					
Not measured	4-foot probe sampler	100	13		ML/OL/ Peat	Dark gray (2.5Y 4/1) SILT/ORGANIC SILT with some clay and light brown fibrous peat and organic matter, moist to wet		
			14					
			15		ML/OL	Same as above, but less clay and peat/organic matter, moist to wet		
			16					
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 14 feet bgs. 10-foot pre-packed well screen with silica filter sand, 4-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.		
			18					
			19					
			20					

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW6
Total depth 16 feet
Sheet 1 of 1

Project name <u>Federal Ctr. S.</u>	Drilling Contractor <u>Pacific NW Probe</u>	Drilling method <u>Driven push probe</u>
Project number <u>10048-12c</u>	Location <u>58 feet due west of HCMW-1</u>	Sampling method <u>4-foot lined probe sampler</u>
Client <u>GSA</u>		Ground elevation <u>N/A</u>
EHSI rep. <u>D. Phelan</u>	Start date <u>11-10-2010</u>	Air monitoring (Y/N) <u>Yes</u>
WDOE Tag No. <u>BCA-226</u>	Compl. date <u>11-10-2010</u>	Instrument(s) <u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details
			1			Asphalt and crushed rock	
0.0	4-foot probe sampler	75	2		SP	Dark olive brown (2.5Y 3/3) fine- to medium-grained SAND, dry to moist	
			3				
			4				
0.0	4-foot probe sampler	65	5				
			6		SP	Same as above, moist	
			7				
			8	▽	SP	Same as above, grades to very dark gray (2.5Y 3/1), moist	
			9				
Not measured	4-foot probe sampler	100	10		ML/OL	Dark gray (2.5Y 4/1) SILT/ORGANIC SILT with brown organic matter (wood fragments, twigs, roots, blades of grass), moist to wet	
			11				
			12				
			13		ML/OL	Same as above, moist to wet	
Not measured	4-foot probe sampler	100	14				
			15		ML	Grades to: Very dark gray (2.5Y 3/1) very fine-grained sandy SILT/SILT, wet	
			16				
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 15 feet bgs. 10-foot pre-packed well screen with silica filter sand, 5-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.	
			18				
			19				
			20				

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW7
Total depth 16 feet
Sheet 1 of 1

Project name <u>Federal Ctr. S.</u>	Drilling Contractor <u>Pacific NW Probe</u>	Drilling method <u>Driven push probe</u>
Project number <u>10048-12c</u>	Location <u>Adjacent to Diagonal Ave. S.,</u>	Sampling method <u>4-foot lined probe sampler</u>
Client <u>GSA</u>	<u>78.5 ft. ENE from NW corner of Bldg 1202</u>	Ground elevation <u>N/A</u>
EHSI rep. <u>D. Phelan</u>	Start date <u>11-10-2010</u>	Air monitoring (Y/N) <u>Yes</u>
WDOE Tag No. <u>BCA-227</u>	Compl. date <u>11-10-2010</u>	Instrument(s) <u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details
			1			Asphalt and crushed rock	
0.7	4-foot probe sampler	40	2		SP/ SP-SM	Dark gray brown (2.5Y 4/2) very fine- to fine-grained SAND, with trace amounts to some silt, moist	
			3				
			4				
0.0	4-foot probe sampler	55	5		SP/ SP-SM	Same as above, moist	
			6				
			7	▽		Groundwater encountered during drilling approximately 7.0 feet bgs	
			8		SP	Grades to: Black (2.5Y 2.5/1) very fine- to fine-grained SAND, wet	
Not measured	4-foot probe sampler	100	9				
			10		SP	Same as above, wet	
			11				
			12		ML/OL	Dark grayish brown (10Y 4/2) SILT/ORGANIC SILT, with some silt, and organic matter (twigs, roots, blades of grass), moderate plasticity, moist to wet	
Not measured	4-foot probe sampler	100	13				
			14				
			15		ML	Grades to: Very dark grayish brown (10Y 3/2) SILT, low to moderate plasticity, moist to wet	
			16				
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 14 feet bgs. 10-foot pre-packed well screen with silica filter sand, 4-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.	
			18				
			19				
			20				

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW8
Total depth 16 feet
Sheet 1 of 1

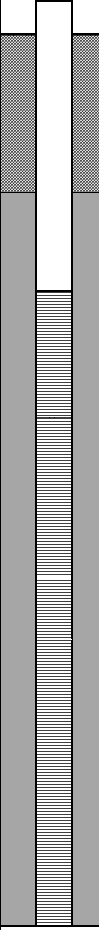
Project name <u>Federal Ctr. S.</u>	Drilling Contractor <u>Pacific NW Probe</u>	Drilling method <u>Driven push probe</u>
Project number <u>10048-12c</u>	Location <u>East side of Bldg 1202, SE</u>	Sampling method <u>4-foot lined probe sampler</u>
Client <u>GSA</u>	<u>east of proposed storage pond</u>	Ground elevation <u>N/A</u>
EHSI rep. <u>D. Phelan</u>	Start date <u>11-11-2010</u>	Air monitoring (Y/N) <u>Yes</u>
WDOE Tag No. <u>BCA-228</u>	Compl. date <u>11-11-2010</u>	Instrument(s) <u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details
			1			Asphalt and crushed rock, with silty sand and gravel, dry to moist	
0.0	4-foot probe sampler	25	2		SP/ SP-SM	Very dark grayish brown (2.5Y 3/2) very fine- to fine-grained SAND, with trace amounts to some silt, moist	
			3				
			4		SP	Grades to: Black (2.5Y 2.5/1) fine- to medium-grained SAND, moist	
0.0	4-foot probe sampler	70	5				
			6				
			7				
			8	▽		Groundwater encountered during drilling at approximately 7.5 feet bgs	
			9		SP/ML/ SP-SM	Grades to: Alternate layers of very dark gray and black (2.5Y 3/2, 2.5/1) very fine- to fine-grained SAND/SILT/very fine- to fine-grained SAND with trace amounts to some silt, wet	
Not measured	4-foot probe sampler	95	10				
			11				
			12				
			13		SP	Black (2.5Y 2.5/1) very fine- to fine-grained SAND, wet	
Not measured	4-foot probe sampler	75	14				
			15				
			16				
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 15 feet bgs. 10-foot pre-packed well screen with silica filter sand, 4-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.	
			18				
			19				
			20				

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW9
Total depth 16 feet
Sheet 1 of 1

Project name	<u>Federal Ctr. S.</u>	Drilling Contractor	<u>Pacific NW Probe</u>	Drilling method	<u>Driven push probe</u>
Project number	<u>10048-12c</u>	Location	<u>East side of Bldg 1202, NE</u>	Sampling method	<u>4-foot lined probe sampler</u>
Client	<u>GSA</u>		<u>and east of proposed storage pond</u>	Ground elevation	<u>N/A</u>
EHSI rep.	<u>D. Phelan</u>	Start date	<u>11-11-2010</u>	Air monitoring (Y/N)	<u>Yes</u>
WDOE Tag No.	<u>BCA-229</u>	Compl. date	<u>11-11-2010</u>	Instrument(s)	<u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details
0.3	4-foot probe sampler	50	1	▽		Asphalt and crushed rock	
					SM	Dark brown silty SAND with gravel, moist	
			2		SP	Black (Gley 1 2.5/) very fine-grained SAND, moist	
0.0	4-foot probe sampler	55	3				
			4			Grades to:	
			5		SP	Very dark gray and very dark grayish brown (2.5Y 3/1, 3/2) very fine- to fine-grained SAND, moist	
Not measured	4-foot probe sampler	100	6				
			7				
			8			Groundwater encountered during drilling at approximately 7.5 feet bgs	
Not measured	4-foot probe sampler	70	9		SP/ SP-SM	Grades to: Black (2.5Y 2.5/1) fine-grained SAND with minor amounts of organic matter (wood fragments) and trace amounts to some silt, wet	
			10				
			11		ML	Grades to: Very dark gray (2.5Y 3/1) SILT/very fine-grained sandy SILT, with minor amounts of organic matter (wood fragments), low plasticity, wet	
Not measured	4-foot probe sampler		12				
			13		SP/ SP-SM	Black (2.5Y 2.5/1) fine- to medium-grained SAND, with trace amounts to some silt, wet	
			14				
			15				
			16				
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 15 feet bgs. 10-foot pre-packed well screen with silica filter sand, 4-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.	
			18				
			19				
			20				

SOIL BORING AND MONITORING WELL CONSTRUCTION RECORD

Boring # EHSI-MW10
Total depth 16 feet
Sheet 1 of 1

Project name <u>Federal Ctr. S.</u>	Drilling Contractor <u>Pacific NW Probe</u>	Drilling method <u>Driven push probe</u>
Project number <u>10048-12c</u>	Location <u>51 feet due east of EHSI-MW1</u>	Sampling method <u>4-foot lined probe sampler</u>
Client <u>GSA</u>	<u>in GSA employee parking lot</u>	Ground elevation <u>N/A</u>
EHSI rep. <u>D. Phelan</u>	Start date <u>11-11-2010</u>	Air monitoring (Y/N) <u>Yes</u>
WDOE Tag No. <u>BCA-230</u>	Compl. date <u>11-11-2010</u>	Instrument(s) <u>MiniRAE 3000 PID</u>

Instrument reading (ppm)	Sample type, interval	% recovery	Depth (feet, BGS)	Water level (feet)	Soil group	Soil description	Well Details
			1			Asphalt and concrete pavement	
0.0	4-foot probe sampler	60	2		SP/ SP-SM	Very dark grayish brown (2.5Y 3/2) very fine- to fine-grained SAND, with trace amounts to some silt, moist.	
			3				
			4				
0.0	4-foot probe sampler	60	5		SP/ SP-SM	Same as above, grades to fine- to medium SAND, moist	
			6				
			7				
			8	▽		Groundwater encountered during drilling at approximately 8 feet bgs	
Not measured	4-foot probe sampler	No recovery	9		SP	Grades to: Very dark gray and black (2.5Y 3/1, 2.5/1) very fine- to fine-grained SAND, wet	
			10				
			11				
			12				
Not measured	4-foot probe sampler	50	13		SP	Grades to: Black (2.5Y 2.5/1) fine- to medium-grained SAND, wet	
			14				
			15				
			16				
			17			The bottom of the boring terminated at 16 feet bgs. A 2-inch diameter PVC monitoring well was installed with the bottom of the well set at 15 feet bgs. 10-foot pre-packed well screen with silica filter sand, 4-foot PVC riser, bentonite chip seal, and flush-graded well monument set in place with a concrete surface seal.	
			18				
			19				
			20				